Investigation of microcystin concentrations and possible microcystin-producing organisms in some Florida lakes and fish ponds

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Introduction

Occurrence of potentially toxic cyanobacteria blooms is very common in Florida lakes. These include blooms of *Microcystis, Anabaena, Oscillatoria* and *Cylindrospermopsis*. Among these the first three are potential microcystin producers. However, the toxicity data for many lakes are not available. We investigated 10 lakes, ranging from 4 to 424 acres in Hillsborough County, Tampa, FL over a two month period. In addition we tested samples from Lake George, St. Johns River system and two fish ponds. Here we present the data obtained from microcystin ELISA and PCR with specific primers targeted to the condensation domain of *mcyA* gene, which were designed to detect microcystin-producing *Microcystis, Anabaena* and *Oscillatoria* strains.

Hypotheses

We propose that many of the lakes in Florida that have high cyanobacteria populations will have microcystins.

Methods

Water samples were collected from each lake with a vertical integrating sampling tube. Sub-samples were taken for phytoplankton counts, chlorophyll measurements, ELISA and PCR. ELISA was performed with the Envirologix Microcystin Plate Kit. Primer pairs, mcyA-CD 1F and mcyA-Cd 1R were used in the PCR reaction.

Results

In the case of Hillsborough County lake samples, microcystins were detected in 3 out of 10 lakes. These were Cedar Lake, Lake Brant and a scum sample on the shore of Lake Magdelene. Microcystin concentrations were 0.11, 1.84 and 18.58 $\mu g.l^{-1}$, respectively. ELISA measurements are compared with the results obtained from the PCR analyses. The possible organisms that might be producing microcystins in these samples are discussed.

Conclusion

In addition to taxonomic identification and assessment of population dynamics of cyanobacteria present in water bodies, it is also vital to determine toxin concentrations and toxin producing organisms. ELISA and PCR are two fast and inexpensive methods that can perform these functions.